Amendments to the Drawings:

The attached sheets of drawings include changes to Figures 6 and 13. Figure 6 has been amended to insert the reference numeral "60", and Figure 13 has been amended to insert the legend --PRIOR ART--.

Attachments: 2 Replacement Sheets

2 Annotated Copies Showing Changes

REMARKS

In the Drawings:

The Examiner has noted that Figure 13 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. Figure 13 is amended herein to insert --PRIOR ART--.

In addition, Figure 6 is amended herein to insert the reference numeral --60-- representing the shaft portion of the gear drive 32, as described, for example, on page 38, lines 13-15 of the instant specification.

Acceptance of these amendments to the drawings is respectfully requested.

Election/Restrictions

Applicants' election with traverse has been rejected by the Examiner. However, Applicants present the following arguments and respectfully request reconsideration of the aforesaid rejection.

The Examiner asserts that the apparatus of the present invention could be used with non-separated film, such as that disclosed in prior art JP 2001-345345. On the contrary, Applicants offer the following description of the present invention and point out why the invention of JP 2001-345345 cannot be substituted for the present invention.

The inspection apparatus of the present invention is for inspecting a film carrier tape for mounting an electronic component which is provided with a plurality of electronic component mounting portions in multiple strips in a transverse direction. Using the individual film carrier tapes which have been previously cut into

strips, the individual film carrier tapes are respectively unwound from the unwinding reel of the unwinding device. The individual film carrier tapes are run in parallel with each other and pass through the inspecting section in the cut condition in individual strips without mutually causing a positional shift (see claims 1 and 2).

In addition, the film carrier tapes, which are provided with a plurality of electronic component mounting portions in multiple strips in the transverse direction, are used without cutting and separating and without unwinding from the unwinding device, and are exactly cut into individual film carrier tapes for mounting an electronic section in the strips by means of the slitting device.

Consequently, the individual film carrier tapes for mounting an electronic component in the strips thus obtained by the slitting run in parallel with each other and pass through the inspecting section without mutually causing a positional shift (see claims 3 and 4).

Accordingly, the film carrier tapes for mounting an electronic component in plural strips, which run in parallel, can be subjected to a visual inspection (a transmitted light inspection and a reflected light inspection) simultaneously and accurately in the inspecting section.

As a result of these various quality inspections for a disconnection, short circuit, dent (i.e., reducing a portion of wiring lead width), a projection or the like, a defect display can be carried out over a defective product through punching, inking, dry ink or the like. In addition, it is possible to mutually separate the individual film carrier tapes in the strips without mutually causing a positional shift and to take

up the individual film carrier tapes upon the individual reels without a winding shift after inspection (see claims 1 and 3).

Moreover, the film carrier tapes for mounting an electronic component, which are cut into strips and inspected in the inspecting section, can also be simultaneously taken up on a plurality of take-up reels attached to separate take-up shafts of the take-up device in parallel, respectively (see claims 2 and 4).

Therefore, it is impossible to apply a film carrier tape in which only one strip of electronic component mounting part is formed and not separated, as shown in Fig. 5 of JP 2001-345345 to the inspection apparatus of the present invention.

Therefore, Applicants submit that the restriction requirement should be withdrawn and all claims 1-46 be examined.

The Present Invention and Cited References

The present invention is for inspecting the film carrier tape T for an electronic component mounting in which a plurality of electronic component mounting portions G (so-called "multiple take-up") is provided in multiple strips in a transverse direction, as shown in Fig. 3.

As shown in Figs. 1 and 2, in the inspecting apparatus 10, a reel R1, upon which a film carrier tape T for mounting an electronic component is wound through a spacer S, is attached to an unwinding drive shaft 14 of an unwinding device 12. Then, by the driving operation of a driving motor, the unwinding drive shaft 14 is rotated so that the film carrier tape T is reeled out from reel R1 together with the spacer S. Thus, the film carrier tape T, which is unwound from the

unwinding device 12 and conveyed, is cut into individual film carrier tapes in strips through a slit device 26 including a cutting blade, and is cut into strips and separated into individual film carrier tapes T1 and T2 as shown in Fig. 2 (see claims 3 and 4).

The film carrier tapes T1 and T2, which are passed through the guide rollers 16 and 18, respectively, are supplied to the inspecting section 20. When passing through a part between the back tension roller 30 and the drive gear 32, the driving operation of the drive gear 32 is stopped temporarily. As a result, the supply of film carrier tape T is stopped and a portion to be inspected is stopped in a predetermined position of the inspecting section 20, that is, inspecting position P.

Moreover, in the inspection section 20, a visual inspection is carried out with a magnifying lens device by human eyes, by utilizing a reflected light or a transmitted light, for example, to detect a disconnection, a short circuit, a dent (i.e., reducing portion of the wiring lead width), a projection and a plating defect, deformation of the shape of the tape, a defect of solder resist or the like, for example, in the wiring portion of a film carrier tape.

Thereafter, the film carrier tapes T1 and T2, which are subjected to the predetermined quality inspection in the inspecting section 20, and on which a defect display is given to predetermined positions by the defect display device 58, pass through the guide rollers 72 and 74 and are taken up by a take-up device 76.

In other words, the film carrier tapes T1 and T2 are configured to be simultaneously taken up over a plurality of take-up reels R2 and R3 which are attached in parallel to the identical take-up driving shaft 78 of the take-up device 76 (claim 3) or which are attached to the separate drive shafts (claim 4). In this case,

the film carrier tapes T1 and T2 are taken up at equal speeds, respectively, by rotation of the take-up drive shaft 78 through the driving operation of a drive motor which is not shown.

Thus, by such a structure, the film carrier tapes for mounting an electronic component, which are provided with a plurality of electronic component mounting portions in multiple strips in the transverse direction, are used without separating, are unwound from the unwinding device, and are exactly cut into individual film carrier tapes for mounting an electronic section in strips by means of the slit device. The individual film carrier tapes thus obtained by the cutting run parallel with each other and pass through the inspecting section without mutually causing a positional shift.

Accordingly, the film carrier tapes for mounting an electronic component in plural strips, which run in parallel, can be subjected to a visual inspection, i.e., a transmitted light inspection and a reflected light inspection, simultaneously and accurately in the inspecting section. As a result of various quality inspections for a disconnection, short circuit, dent (i.e., reducing portion of wiring lead width), a projection and the like, a defect display can be carried out over a defective product through punching, inking, dry ink or the like.

Therefore, the film carrier tapes for mounting an electronic component, which are provided with a plurality of electronic component mounting portions in multiple strips in the transverse direction, can be inspected simultaneously. Thus, inspection efficiency and precision can be greatly enhanced. In addition, it is possible to mutually separate the individual film carrier tapes for mounting an

electronic component in the strips without mutually causing a positional shift and to take up the individual film carrier tapes on the individual reels without a winding shift after inspection.

Moreover, as illustrated in Fig. 11, film carrier tapes T1 and T2, which are previously cut into individual film carrier tapes T1 and T2 in strips, are separately wound on unwinding reels R1 and RE1' of an unwinding device 12, respectively. Thus, even if the film carrier tapes for mounting an electronic component which have been previously cut into individual film carrier tapes are used, the same functions and effects as those of the embodiment shown in Fig. 1 can be obtained (claims 1 and 2).

Prior Art Reference JP 2001-345345 to Sadahiko:

The Sadahiko reference relates to a processing apparatus for a tape-like object in which, when the film carrier tape for mounting an electronic component is treated in such as the inspecting section, position accuracy is good, an exact stop position is obtained, and reliable processing can be carried out. For this reason, as shown in Figs. 2 and 3 of Sadahiko, the dancer roller 60 for unwinding and the dancer roller 80 for rolling up are equipped with three sensors 71-73, 91-93, formed in the vertical direction, respectively.

The position of these rollers is detected by the sensor so that the respective normal rotation and inverse rotation of the unwinding device and the take-up device are controlled. Moreover, the position of these dancer rollers is always in

a fixed range so that the tension added to a tape-like object may always serve as a fixed value.

However, it is apparent that Sadahiko would not be suitable for a film carrier tape for an electronic component mounting in which a plurality of electronic component mounting portions G (so-called "multiple take-ups") is provided in multiple strips in a transverse direction, as shown in Fig. 3 of the present invention.

In other words, the object of Sadahiko, i.e., the film carrier tape for mounting an electronic component is a film carrier tape on which only one strip of an electronic component mounting part 204 is formed and is not separated, as shown in Fig. 5.

Therefore, Sadahiko does not disclose or suggest the following features of claims 1 and 2 of the present invention:

--using the individual film carrier tapes for mounting an electronic component which are previously cut into strips; and

--the individual film carrier tapes are respectively unwound from the unwinding reel of the unwinding device, and the individual film carrier tapes for mounting an electronic component are run in parallel with each other and pass through the inspecting section in the cut state in individual strips without mutually causing a positional shift.

In addition, Sadahiko does not teach or suggest the following features of claims 3 and 4 of the present invention:

-- using the film carrier tape for mounting an electronic component, which are provided with a plurality of electronic component mounting portions in multiple strips in the transverse direction without cutting and separating; and

-- the film carrier tapes for mounting an electronic component are unwound from the unwinding device and are exactly cut into individual film carrier tapes for mounting an electronic section in strips by means of the slit device, and the individual film carrier tapes in the strips thus obtained by the cutting run in parallel with each other and pass through the inspecting section without mutually causing a positional shift.

Furthermore, Sadahiko does not teach or suggest the following functions/effects of the present invention:

-- it is possible to mutually separate the individual film carrier tapes for mounting an electronic component in strips without mutually causing a positional shift and to take up the individual film carrier tapes upon individual reels without a winding shift after inspection (see claims 1 and 3); and

-- the film carrier tapes for mounting an electronic component, which are cut into strips and inspected in the inspecting section, can also be simultaneously taken up on a plurality of take-up reels attached to the separate take-up shafts of the take-up device in parallel, respectively (see claims 2 and 4).

Moreover, in the present invention, in order to correctly inspect the film carrier tape T for mounting an electronic component in which a plurality of electronic component mounting portions G is provided in multiple strips in a transverse

direction, the special components for inspecting such as the guide member as in claim 5, drive gear as in claim 6, and guide roller as in claim 7 are adopted.

Namely, according to the guide member of claim 5, the film carrier tapes for mounting an electronic component are caused to run in parallel and are not curved in the transverse direction, that is, the tapes are not flexed, respectively. Consequently, inspecting positions along the tapes are flat and constant. As a result, it is possible to carry out an accurate quality inspection with high precision without shifting the focal point of a magnifying glass or the like, in the quality inspection requiring very high precision for an inner lead bend, a flaw and the like.

Moreover, according to the drive gear of claim 6, all of the sprocket holes provided in the adjacent side portions and the side portions on both ends of the film carrier tapes, which are cut into strips, mesh with the teeth of both the end gears and the intermediate gear in the drive gear, and, as a result, the carrier tapes are simultaneously conveyed at an equal speed. Therefore, in the inspecting section, the respective positions of the parallel running film carrier tapes are not shifted from each other. Therefore, it is possible to simultaneously carry out an accurate quality inspection with high precision for a plurality of film carrier tapes at the same time.

Furthermore, according to the guide roller of claim 7, the adjacent side portions of the film carrier tapes for mounting an electronic component, which are cut into strips, are guided in a mutual separating state by the adjacent part guide protruded portion in the guide roller. As a result, in the conveyance, the adjacent side portions of the film carrier tapes are prevented from coming into contact with

each other and being worn away and damaged. Consequently, quality is enhanced, and a winding shift or the like does not occur in the take-up.

In Sadahiko, there is no disclosure or suggestion concerning such features as claimed in claims 5-7 of the present invention as discussed above.

In addition, with respect to the drive gear of Sadahiko, only the construction of the drive gear for normal one strip of film carrier tapes is disclosed. Therefore, it is apparent that in the drive gear of Sadahiko, the both end gears and intermediate gear as provided in claim 6 of the present invention is not taught or suggested.

Therefore, it is apparent that it would be impossible to correctly inspect a film carrier tape T having a plurality of electronic component mounting portions G provided in multiple strips in a transverse direction by using the inspection apparatus of Sadahiko.

Prior Art Reference U.S. Patent No. 4,960,234 of Focke:

Focke relates to a packaging machine in which a material web 11 of double width is supplied as a packaging material, for example tin foil, for producing a paper-rolled cigarette as shown in Fig. 1. Two division webs 12 and 13 are formed from the material web 11 of double width by cutting this web in the center, as shown in Fig. 3. That is, a cutting unit 15 is used, consisting of a circular cutting knife 16 and the receptacle roller 17, over the circumference of which the web of material 11 is guided. This receptacle roller 17 is equipped with a narrow circumference slot 18, which matches the disc-shaped cutting knife 16. This horizontal end forms the

cutting edge 19, the portion of the edge of the outside of the cutting knife 16 contacts this cutting edge 19, and the material web 11 is cut.

Then a blank 14 is made by further dividing these division webs 12 and 13. These division webs 12 and 13 are running in parallel and almost simultaneously, without separating from advance. To attain this running, deflecting rollers 32, 33 and deflecting rollers 60, 63 are arranged aslant.

However, the object of the Focke invention is a packaging material which consists of tin foil for producing a paper rolled cigarette. Therefore, the object of Focke would be completely different from the film carrier tape for electronic component mounting in which a plurality of electronic component mounting portions G is provided in multiple strips in a transverse direction, as shown in Fig. 3 of the present invention.

Moreover, in the present invention, in order to correctly inspect the film carrier tape T in which a plurality of electronic component mounting portions G are provided in multiple strips in a transverse direction, the special composition for inspecting that guide member as disclosed in claim 5, drive gear as in claim 6, and guide roller as in claim 7 are adopted. These special constructions are not taught or suggested in Focke.

Prior Art Reference JP 2001-035891 of Hasegawa:

Hasegawa relates to a tape guide apparatus for positioning a TAB tape correctly in a predetermined position when electric inspection of the film carrier tape for mounting an electronic component is carried out. However, it is also apparent

that Hasegawa does not teach or suggest a film carrier tape for electronic component mounting in which a plurality of electronic component mounting portions G are provided in multiple strips in a transverse direction, as shown in Fig. 3 of the present invention.

That is, Hasegawa consists of a film carrier tape on which only one strip of electronic component mounting part 2004 is formed and is not separated, as shown in Fig. 7. Therefore, Hasegawa does not have the side guide portions 38 and 40 which serve to guide both end side portions T3 and T4 of the film carrier tape on an outermost side, as claimed in claim 5 and as shown in Fig. 5 of the present invention.

In addition, Hasegawa does not have adjacent part guide portions 42, which guide the adjacent side portions T5 and T6 of the film carrier tape cut into strips.

According to the guide member of claim 5, the film carrier tapes for mounting an electronic component, which are caused to run in parallel, are not curved in the transverse direction, that is, are not flexed respectively. Consequently, inspecting positions along the tapes are flat and constant. As a result, it is possible to carry out an accurate quality inspection with high precision without shifting the focal point of a magnifying glass or the like, allowing for quality inspection that requires very high precision for detecting an inner lead bend, a flaw and the like.

On the other hand, in the tape guide apparatus 16 of Hasegawa, as shown in Figs. 1 and 3, a positioning board member 24 rotates in the direction of arrow D. In addition, a pair of longitudinal direction positioning pins 26 and 28 are

formed in the both ends of the width direction by the side of an advance end on the upper surface of this positioning board member 24, which are formed in the position corresponding to the sprocket holes of the TAB tape.

When a TAB tape is fed continuously and is moving, the longitudinal direction positioning pins 26 and 28 are pressed by the TAB tape which moves. As a result, the longitudinal direction positioning pins 26 and 28 are energized in the direction which they do not protrude from the standard side of the guide frames 12 and 14. Consequently, the positioning board member 24 is rotated clockwise against the spring member 36.

Then, when the fed TAB tape is suspended in order to carry out electric inspection, the positioning board member 24 is rotated counterclockwise by the energization power of the spring member 36. At this time the longitudinal direction positioning pins 26 and 28 are projected up more than the standard side of the guide frames 12 and 14. Consequently, the longitudinal direction positioning pins 26 and 28 are projected inside the sprocket holes of a TAB tape. Thereby, the stop position of the longitudinal direction of a TAB tape can be correctly determined.

In the tape guide apparatus 16 of Hasegawa, the longitudinal direction positioning pins 26 and 28 are projected into the sprocket holes of a TAB tape. Therefore, it is clear that the tape guide apparatus 16 of Hasegawa would not be equivalent to the side guide portions 38 and 40 and the adjacent part guide portion 42 of the present invention.

Moreover, as shown in Fig. 4, in the tape guide apparatus 16 of Hasegawa, a space is formed between the guide frames 12 and 14, and respective

side edges of the TAB tape are merely guided and positioned by the positioning pins 46 and 48 of the width direction-positioning member.

Therefore, it is apparent that it would be impossible to convey the film carrier tape for mounting an electronic component which is cut into strips as claimed in the present invention by using the tape guide apparatus 16 of Hasegawa.

Conclusion

The Examiner's reconsideration and favorable action with respect to pending claims 1-46 are respectfully requested in light of the above remarks.

Respectfully submitted,

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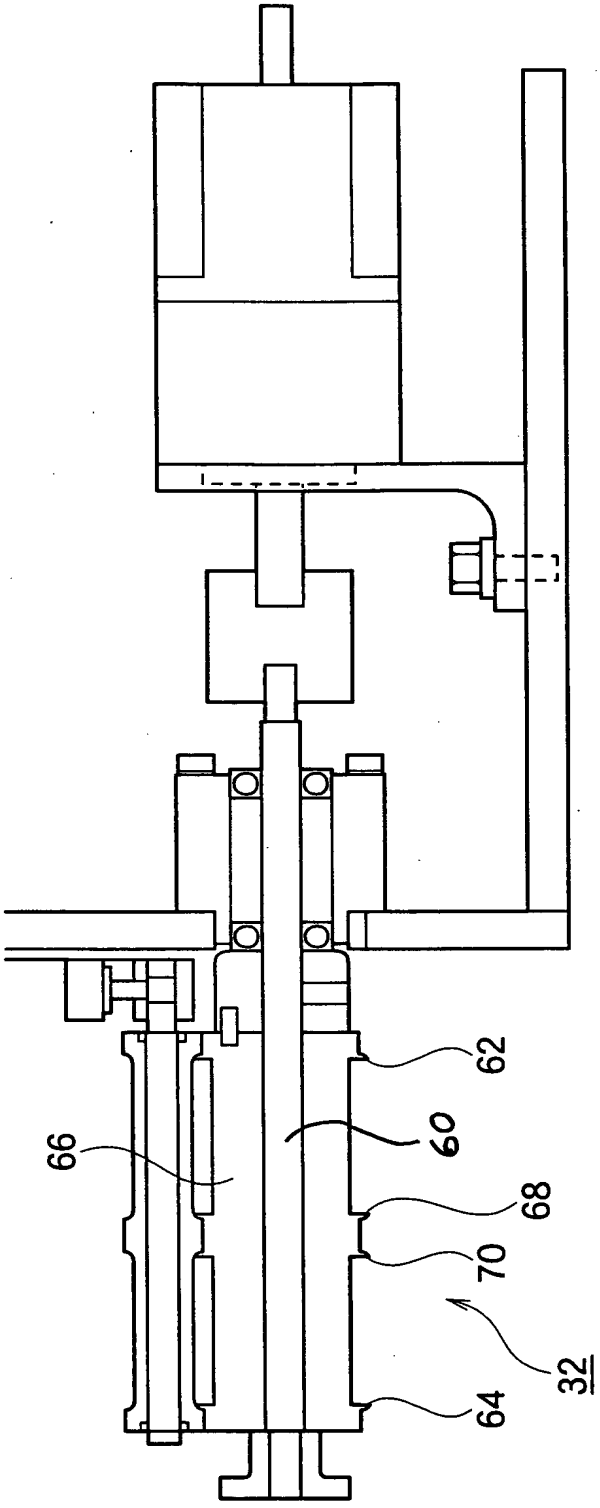

Fig. 6

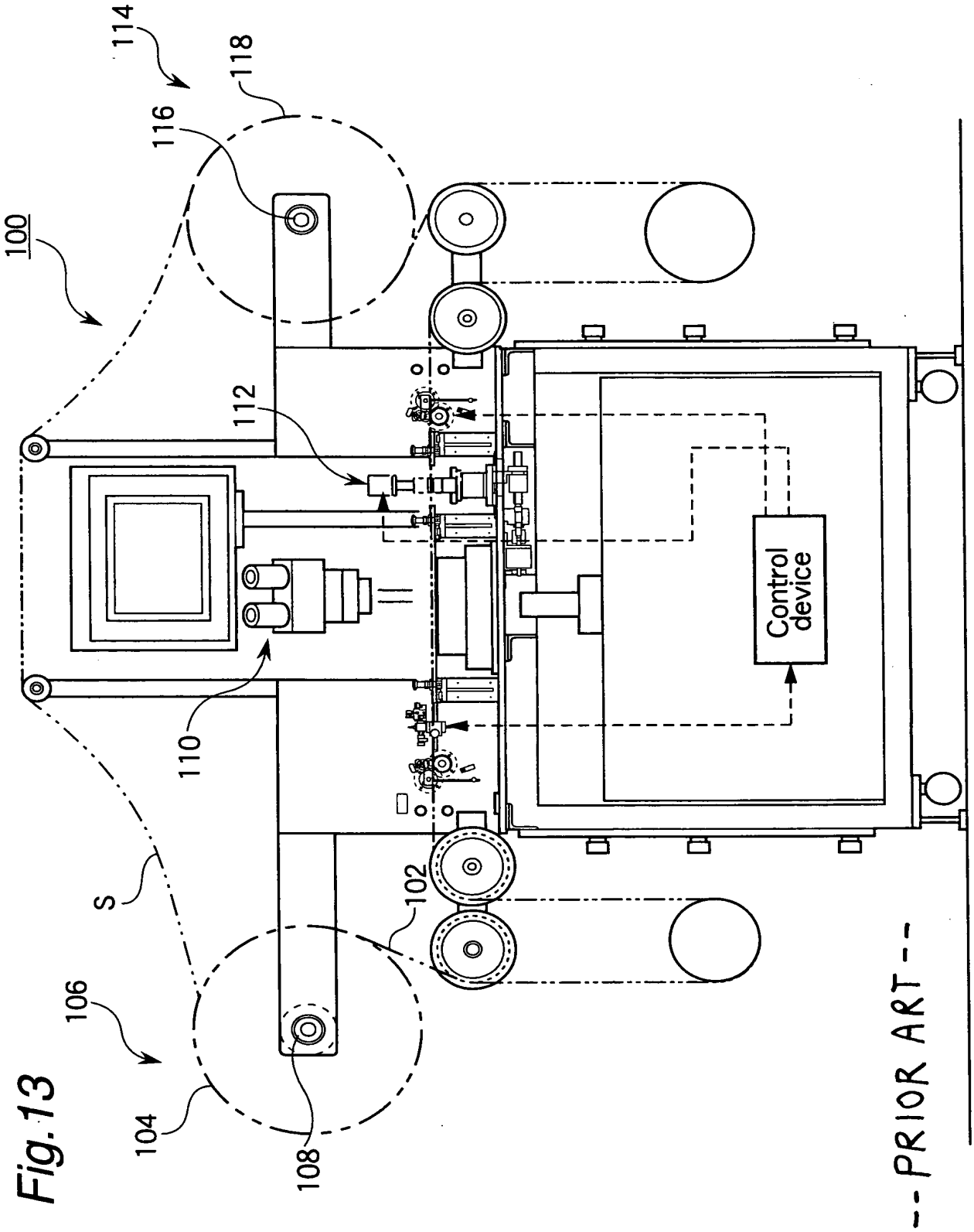
114
118
116
100
112
Control device
110
S
102
106
104
108
-- PRIOR ART --

Fig. 13